

Amendments to the Claims:

This listing of the claim will replace all prior versions, and listings, of the claim in the application:

Listing of Claims:

What is claimed is:

1. (currently amended) A spectrometer, comprising:
 - a source of a primary beam of radiant energy;
 - a beamsplitter fixed in relation to the primary beam, for dividing primary beam into at least first and second energy beams which follow first and second optical paths;
 - a tunable solid-state reference laser coupled to the spectrometer through a filter;
 - at least one return reflector for reflecting the first beam back to the beamsplitter;
 - at least one radiant energy detector; and
 - a control, data acquisition and processing electronic system.
2. (currently amended) A spectrometer, comprising:
 - a source of a primary beam of radiant energy;
 - a beamsplitter fixed in relation to the primary beam, for

dividing primary beam into at least first and second energy beams which follow first and second optical paths;

at least one return reflector for reflecting the first beam back to the beamsplitting means;

at least one radiant energy detector;

a control, data acquisition and processing electronic system; and

a roof reflector rigidly coupled to the beamsplitter for the purpose of folding the second beam by an angle τ .

3. (currently amended) A spectrometer, comprising:

a source of a primary beam of radiant energy;

a beamsplitter fixed in relation to the primary beam, for dividing primary beam into at least first and second energy beams which follow first and second optical paths;

at least one return reflector for reflecting the first beam back to the beamsplitting means;

at least one radiant energy detector;

a control, data acquisition and processing electronic system; and

at least one flat compensator plate, having parallel faces, which may be scanned by nutation to vary the optical path difference τ .

4. (currently amended) ~~the~~ The spectrometer of claim 1 where the filter is an etalon~~7.~~
5. (currently amended) ~~the~~ The spectrometer of claim 1 where the solid-state laser is a vertical cavity surface emitting laser~~7.~~
6. (currently amended) ~~the~~ The spectrometer of claim 1 where the solid state laser has a linewidth of less than \pm ~~cm.sup.-1~~ one wavenumber ~~7.~~
7. (currently amended) ~~the~~ The roof reflector assembly of claim 2 where the assembly is machined by wire EDM~~7.~~
8. (currently amended) ~~the~~ The roof reflector assembly of claim 2 where the assembly is fabricated from ceramic~~7.~~
9. (currently amended) ~~the~~ The roof reflector assembly of claim 2 where the reflective coating is prepared by replication~~7.~~
10. (currently amended) ~~the~~ The spectrometer of claim 3 where a second refractive scanning plate is interposed in the first or second beam~~7.~~

11. (currently amended) ~~the~~ The spectrometer of claim 1 where the signal generated by the ~~diode~~ solid-state reference laser is demodulated~~;~~.
12. (currently amended) ~~the~~ The spectrometer of claim 1 wherein the detector further comprises a transfer function and wherein an additional source of radiant energy is used to probe the transfer functions of the detector ~~or detectors~~~~;~~.
13. (currently amended) ~~the~~ The spectrometer of claim 1 wherein the detector further comprises a transfer function and the transfer function of the detector is inverted by the use of an adaptive filter~~;~~.
14. (currently amended) ~~the~~ The spectrometer of claim I where the radiation detector detects an optically subtracted beam~~;~~.
15. (currently amended) ~~the~~ The spectrometer of claim 1 further comprising an additional source of radiant energy acting as a signal probe providing a response, and wherein the detector further comprises a detector signal, and whereby the detector signal is modified by the control, data

acquisition and processing electronic system to correct for nonlinear response using the response to ~~a~~ the probe signal~~7.~~

16. (currently amended) ~~the~~ The spectrometer of claim 2 further comprising an additional source of radiant energy acting as a signal probe providing a response, and wherein the detector further comprises a detector signal, and whereby the detector signal is modified by the control, data acquisition and processing electronic system to correct for nonlinear response using the response to ~~a~~ the probe signal~~7.~~

17. (currently amended) ~~the~~ The spectrometer of claim 3 further comprising an additional source of radiant energy acting as a signal probe providing a response, and wherein the detector further comprises a detector signal, and whereby the detector signal is modified by the control, data acquisition and processing electronic system to correct for nonlinear response using the response to ~~a~~ the probe signal~~7.~~